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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/812,949	03/31/2004	Leonard Dauphinee	1875.4900001	4931

26111 7590 07/16/2007
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EXAMINER	
TRAN, TRANG U	
ART UNIT	PAPER NUMBER
2622	
MAIL DATE	DELIVERY MODE
07/16/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/812,949	GOPINATHAN ET AL.	
	Examiner	Art Unit	
	Trang U. Tran	2622	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 May 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *5/23/2007*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 1-26 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 13-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zarubin (US Patent No. 6,792,250 B1) in view of Utsunomiya et al (US 2007/0126937 A1).

In considering claim 13, Zarubin discloses all the claimed subject matter, note 1) the claimed a bandpass filter having a passband determined to pass a desired channel and attenuate an image channel of said desired channel is met by the bandpass filter 445 (Figs. 1 and 4, col. 5, lines 4-21), and 2) the claimed an image cancellation circuit coupled across input and output terminals of said bandpass filter, including an attenuator having an attenuation determined by an attenuation of said image channel at an output of said bandpass filter, and a phase shifter coupled to said attenuator that provides a phase shift of approximately 180 degrees at the image channel frequency is met by the phase shift network 445 which comprises an attenuator, a filter, and a phase shifter, and the phase shifter is responsible for making a 180 degree phase adjustment

to the second prefiltered (and now attenuated) signal 420 (Figs. 4 and 5, col. 5, line 4 to col. 7, line 40). However, Zarubin explicitly does not disclose the newly added limitation that the attenuator having an attenuation **at said desired channel and said image channel both** determined by an attenuation of said image channel at an output of said bandpass filter.

Utsunomiya et al teaches in general, the UHF/VHF tuner receives a radio frequency ("RF") television signal that includes a plurality of channels (see page 1, paragraph #0005).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the UHF/VHF tuner as taught by Utsunomiya et al into Zarubin's system in order to receives additional television channels.

In considering claim 14, the proposed combination of Zarubin and Utsunomiya et al discloses all the limitations of the instant invention as discussed in claim 13 above, except for providing the claimed wherein said bandpass filter is a SAW filter. The capability of using the bandpass filter is a SAW filter is old and well known in the art. Therefore, the Official Notice is taken. Therefore, it would have been obvious to one ordinary skill in the art at the time of the invention to incorporate the old and well known using of bandpass filter is a SAW filter into Zarubin's system in order to reduce size and cost of the system.

In considering claim 15, the claimed wherein: said attenuator includes at least one resistor connected between said input and output terminals of said bandpass filter; and said phase shifter includes at least one capacitor coupled between ground and a

terminal of said at least one resistor is met by the phase shift network 445 (Figs. 4 and 5, col. 6, line 22 to col. 7, line 40).

In considering claim 16, the claimed wherein said attenuator includes first and second resistors coupled in series with each other and in parallel with said bandpass filter is met by the R1 and R2 of the phase shift network 445 (Figs. 4 and 5, col. 6, line 22 to col. 7, line 40).

In considering claim 17, the proposed combination of Zarubin and Utsunomiya et al discloses all the limitations of the instant invention as discussed in claims 13 and 16 above, except for providing the claimed wherein said phase shifter includes a capacitor between ground and a terminal connection between said first and second resistors. The capability of using said phase shifter includes a capacitor between ground and a terminal connection between said first and second resistors is old and well known in the art. Therefore, the Official Notice is taken. Therefore, it would have been obvious to one ordinary skill in the art at the time of the invention to incorporate the old and well known using of said phase shifter includes a capacitor between ground and a terminal connection between said first and second resistors into Zarubin's system since it merely amount of selecting available components.

In considering claim 18, the claimed wherein an attenuator input is coupled to said input of said bandpass filter, a phase shifter input is coupled to an output of said attenuator, and an attenuator output is coupled to an output of said bandpass filter is met by the phase shift network 445 (Figs. 4 and 5, col. 6, line 22 to col. 7, line 40).

4. Claims 1-2, 5-12, 19, 21 and 23-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Birleson et al (US Patent No. 6,177,964 B1) in view of Zarubin (US Patent No. 6,792,250 B1) and further in view of Utsunomiya et al (US 2007/0126937 A1).

In considering claim 1, Birleson et al discloses all the claimed subject matter, note 1) the claimed a method of image channel suppression in a receiver having a bandpass filter coupled to an input of a mixer, the bandpass filter having a passband that passes a desired channel and a stopband attenuation at an image channel (the mixer 103 and the first IF filter 109 of Fig. 1), comprising receiving an input signal having the desired channel and the image channel is met by the tuner 10 (Fig. 1, col. 7, line 45 to col. 8, line 9), and 2) the claimed filtering the input signal in the bandpass filter to produce a filtered signal is met by the first IF filter 109 (Fig. 1, col. 8, lines 10-53).

However, Birleson et al explicitly do not disclose the claimed attenuating the input signal by the stopband attenuation of the bandpass filter to provide an attenuated signal; phase shifting the attenuated signal by approximately 180 degrees at the image channel to produce an image cancellation signal; and combining the filtered signal with the image cancellation signal to produce an output signal, to suppress the image channel in the output signal.

Zarubin teaches that Fig. 4 is a block diagram of an example embodiment of the method and system for spurious and noise cancellation, input signal 405 is fed into power coupler 435, power couple 435 splits input signal 405 into a first prefiltered signal 420, to be fed to phase shift network 445, in-phase filtered signal 415, which represents

the output of bandpass filter 440, is combined in power combiner 450 with phase-shifted signal 425, which phase-shifted signal represents the output of phase shift network 445,... the phase shift network 445 which comprises an attenuator, a filter, and a phase shifter, and the phase shifter is responsible for making a 180 degree phase adjustment to the second prefiltered (and now attenuated) signal 420 (Figs. 4 and 5, col. 5, line 4 to col. 7, line 40).

Therefore, it would have been obvious to one ordinary skill in the art at the time of the invention to incorporate the phase shift network which parallel with the bandpass filter as taught by Zarubin into Birleson et al's system in order to provide the necessary attenuation to filter out the desirable signal component and pass the unwanted signal component so that the quality of the output signal can be improved.

The proposed combination of Birleson et al and Zarubin explicitly does not disclose the newly added limitation that the attenuator having an attenuation **at said desired channel and said image channel both** determined by an attenuation of said image channel at an output of said bandpass filter.

Utsunomiya et al teaches in general, the UHF/VHF tuner receives a radio frequency ("RF") television signal that includes a plurality of channels (see page 1, paragraph #0005).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the UHF/VHF tuner as taught by Utsunomiya et al into Birleson et al's system in order to receives additional television channels.

In considering claim 2, the claimed wherein the desired channel in the input signal occurs at a first IF frequency (IF1), further comprising the step of: mixing the output signal of the combining step with a local oscillator signal to down-convert the desired channel to a second IF frequency (IF2) is met by the mixer 110 (Fig. 1, col. 8, lines 10-64 of Birleson et al).

In considering claim 5, the combination of Birleson et al, Zarubin and Utsunomiya et al disclose all the limitations of the instant invention as discussed in claim 1 above, except for providing the claimed wherein the bandpass filter is a SAW filter. The capability of using the bandpass filter is a SAW filter is old and well known in the art. Therefore, the Official Notice is taken. Therefore, it would have been obvious to one ordinary skill in the art at the time of the invention to incorporate the old and well known using of bandpass filter is a SAW filter into the combination of Birleson et al and Zarubin's system in order to reduce size and cost of the system.

In considering claim 6, the claimed wherein the steps of attenuating and phase shifting are performed in parallel with the filtering step is met by the phase shift network 445 (Figs. 4 and 5, col. 6, line 22 to col. 7, line 40 of Zarubin).

In considering claim 7, discloses all the claimed subject matter, note 1) the claimed a method of image channel suppression in a dual conversion receiver having a first mixer, a bandpass filter coupled to an output of the first mixer, and a second mixer coupled to the output of the bandpass filter (the mixer 103 and the first IF filter 109 of Fig. 1) the method comprising: receiving an RF input signal having a plurality of channels is met by the tuner 10 (Fig. 1, col. 7, line 45 to col. 8, line 9), 2) the

claimed up-converting the RF input signal to generate a first IF signal is met by the mixer 103 and the local oscillator 104 (Fig. 1, col. 8, lines 10-53), 3) the claimed filtering the first IF signal in the bandpass filter to select a desired channel from the plurality of channels that falls in a passband of the bandpass filter, so as to produce a filtered first IF signal having the desired channel and an image channel that is attenuated by a stopband attenuation of the bandpass filter is met by the first IF filter 109 (Fig. 1, col. 8, lines 10-53), and 4) the claimed down-converting the result of the combining step to a second IF signal having the desired channel is met by the mixer 110 and the local oscillator 111 (Fig. 1, col. 8, lines 19-64).

However, Birleson et al explicitly do not disclose the claimed generating an image cancellation signal from the first IF signal, the image cancellation signal having an amplitude substantially equal to the image channel in the first filtered IF signal and a phase that is offset by approximately 180 degrees from the image channel in the first filtered IF signal; and combining the filtered first IF signal with the image cancellation signal.

Zarubin teaches that Fig. 4 is a block diagram of an example embodiment of the method and system for spurious and noise cancellation, input signal 405 is fed into power coupler 435, power couple 435 splits input signal 405 into a first prefiltered signal 420, to be fed to phase shift network 445, in-phase filtered signal 415, which represents the output of bandpass filter 440, is combined in power combiner 450 with phase-shifted signal 425, which phase-shifted signal represents the output of phase shift network 445,... the phase shift network 445 which comprises an attenuator, a filter, and a phase

shifter, and the phase shifter is responsible for making a 180 degree phase adjustment to the second prefiltered (and now attenuated) signal 420 (Figs. 4 and 5, col. 5, line 4 to col. 7, line 40).

Therefore, it would have been obvious to one ordinary skill in the art at the time of the invention to incorporate the phase shift network which parallel with the bandpass filter as taught by Zarubin into Birleson et al's system in order to provide the necessary attenuation to filter out the desirable signal component and pass the unwanted signal component so that the quality of the output signal can be improved.

The proposed combination of Birleson et al and Zarubin explicitly does not disclose the newly added limitation that the attenuator having an attenuation **at said desired channel and said image channel both** determined by an attenuation of said image channel at an output of said bandpass filter.

Utsunomiya et al teaches in general, the UHF/VHF tuner receives a radio frequency ("RF") television signal that includes a plurality of channels (see page 1, paragraph #0005).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the UHF/VHF tuner as taught by Utsunomiya et al into Birleson et al's system in order to receives additional television channels.

In considering claim 8, the claimed further comprising the step of: filtering the second IF signal is met by the second IF filter 113 (Fig. 1, col. 8, lines 54-64 of Birleson et al).

In considering claim 9, the claimed wherein the step of generating the image cancellation signal from the first IF signal includes the steps of: attenuating the first IF signal by an amount approximately equal to the stopband attenuation of the bandpass filter at the image channel frequency; and phase shifting the result of the attenuating step so that the image cancellation signal is 180 degrees out-of-phase with the filtered first IF signal at the image channel frequency is met by the phase shift network 445 which comprises an attenuator, a filter, and a phase shifter, and the phase shifter is responsible for making a 180 degree phase adjustment to the second prefiltered (and now attenuated) signal 420 (Figs. 4 and 5, col. 5, line 4 to col. 7, line 40 of Zarubin).

Claim 10 is rejected for the same reason as discussed in claim 6.

In considering claim 11, the claimed wherein the up-converting step includes the step of: mixing the RF input signal with a first local oscillator signal having a frequency determined to shift the desired channel to the passband of the bandpass filter is met by the mixer 103 and the local oscillator 104 (Fig. 1, col. 8, lines 10-53 of Birleson et al).

Claim 12 is rejected for the same reason as discussed in claim 2.

Claim 19 is rejected for the same reason as discussed in claim 7.

In considering claim 21, the claimed wherein said image channel falls outside said passband of said bandpass filter is met by the first IF filter 109 (Fig. 1, col. 8, lines 10-53 of Birleson et al).

In considering claim 23, the claimed wherein said first and second mixers are configured to have differential inputs and outputs is met by the mixers 103 and 110 (Fig. 1, col. 8, lines 10-64 of Birleson et al).

Claim 24 is rejected for the same reason as discussed in claim 5.

In considering claim 25, the claimed wherein said first and second mixers are disposed on a common substrate and said bandpass filter is external to said common substrate is met by the filter 109 which may be constructed on the same integrated circuit substrate as mixers 103 and 110 or filter 109 may be a discrete off-chip device (Fig. 1, col. 8, lines 10-64 of Birleson et al).

In considering claim 26, the claimed wherein the desired channel in the input signal occurs at an RF frequency (RF), further comprising the step of: mixing the output signal of the combining step with a local oscillator signal to down-convert the desired channel from the RF frequency to an IF frequency (IF) is met by the mixer 103 and the local oscillator 104 (Fig. 1, col. 8, lines 10-53 of Birleson et al). However, the combination of Birleson et al, Zarubin, and Utsunomiya et al explicitly do not disclose the claimed wherein the image channel occurs at an approximate frequency of (RF-2.IF). The capability of using the image channel occurs at an approximate frequency of (RF- 2.IF) is old and well known in the art. Therefore, the Official Notice is taken. Therefore, it would have been obvious to one ordinary skill in the art at the time of the invention to incorporate the old and well known using of the image channel occurs at an approximate frequency of (RF- 2.IF) into the combination of Birleson et al, Zarubin and Utsunomiya et al's system in order to output the desired frequency for the image channel.

5. Claims 3-4, 20 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Birleson et al (US Patent No. 6,177,964 B1) in view of Zarubin (US

Patent No. 6,792,250 B1) and Utsunomiya et al (US 2007/0126937 A1), and further in view of the admitted prior art (pages 1-3 of the Specification).

In considering claim 3, the combination of Birleson et al, Zarubin and Utsunomiya et al discloses all the limitations of the instant invention as discussed in claims 1 and 2 above, except for providing the claimed wherein the image channel in the input signal occurs at an approximate frequency of (IF1 – 2.IF2). The admitted prior art discloses that when the tuner is configured to output the desired channel at second IF (e.g. 36 MHz or 44 MHz for cable), an image channel or frequency is also down-converted to the second IF that interferes with the desired channel, for standard TV channels, the second IF is located at the IF1- 2.IF2 (page 2, [0006] of the Specification). Therefore, it would have been obvious to one ordinary skill in the art at the time of the invention to incorporate the second IF as taught by the admitted prior art into the combination of Birleson et al, Zarubin and Utsunomiya et al's system in order to output the desired frequency for the image channel.

In considering claim 4, the claimed further comprising the step of: filtering the desired channel at IF2 using a second bandpass filter is met by the second IF filter 113 (Fig. 1, col. 8, lines 54-64 of Birleson et al).

Claim 20 is rejected for the same reason as discussed in claim 3.

In considering claim 22, the claimed wherein said image cancellation circuit includes: an attenuator having an attenuation that approximately matches an attenuation of said bandpass filter at said image channel and said desired channel; and a phase shifter that phase shifts an output of said attenuator by approximately 180

degrees is met by the phase shift network 445 which comprises an attenuator, a filter, and a phase shifter, and the phase shifter is responsible for making a 180 degree phase adjustment to the second prefiltered (and now attenuated) signal 420 (Figs. 4 and 5, col. 5, line 4 to col. 7, line 40 of Zarubin).

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Trang U. Tran whose telephone number is (571) 272-7358. The examiner can normally be reached on 8:00 AM - 5:30 PM, Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David L. Ometz can be reached on (571) 272-7593. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

July 8, 2007

Trang U. Tran
Primary Examiner
Art Unit 2622